FIG. 1

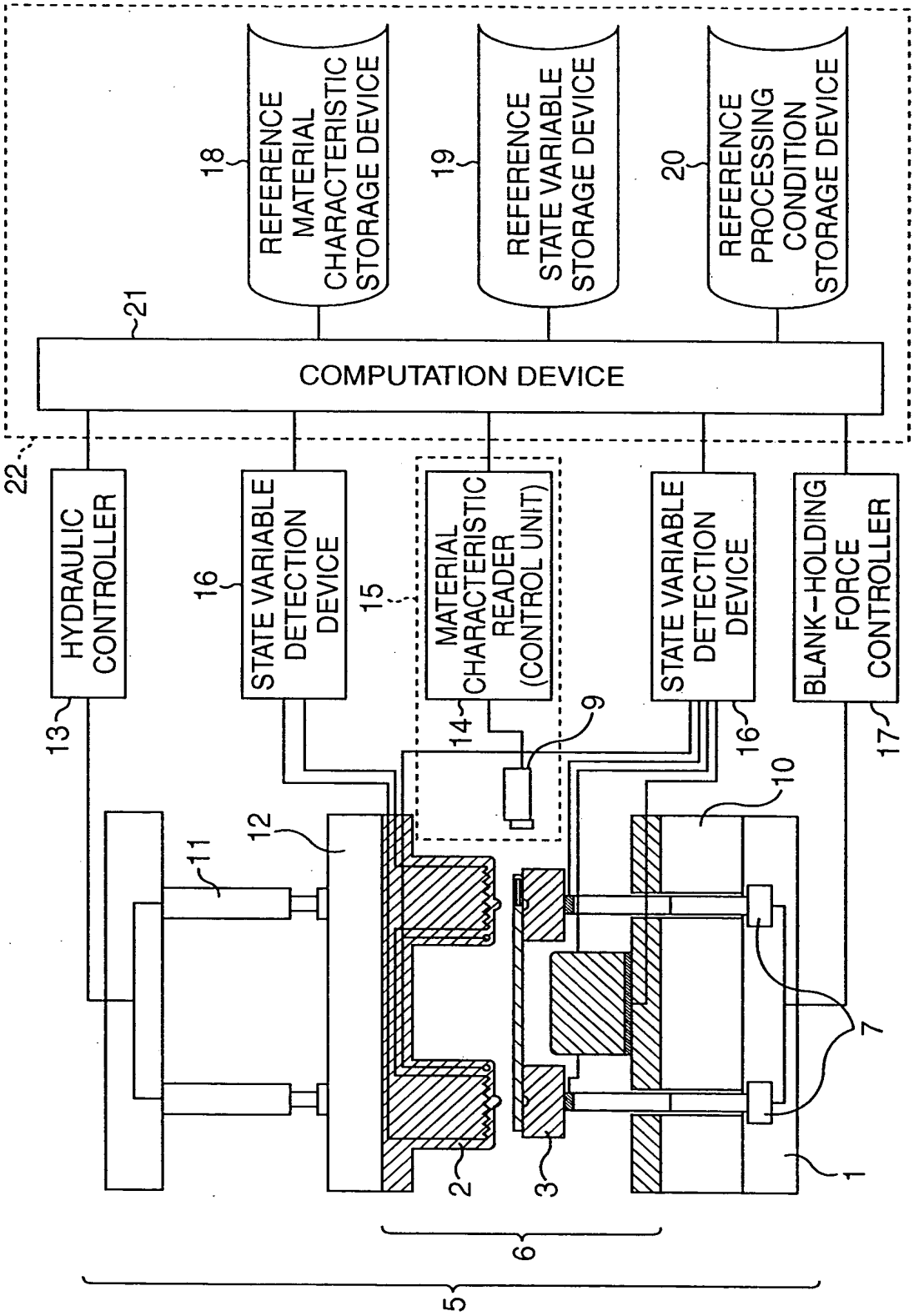

18
REFERENCE MATERIAL CHARACTERISTIC STORAGE DEVICE
19
REFERENCE STATE VARIABLE STORAGE DEVICE
20
REFERENCE PROCESSING CONDITION STORAGE DEVICE
21
COMPUTATION DEVICE
22
HYDRAULIC CONTROLLER
13
16
STATE VARIABLE DETECTION DEVICE
15
MATERIAL CHARACTERISTIC READER (CONTROL UNIT)
14
9
STATE VARIABLE DETECTION DEVICE
16
BLANK-HOLDING FORCE CONTROLLER
17
10
11
12
7
2
3
1
6
5

FIG. 2

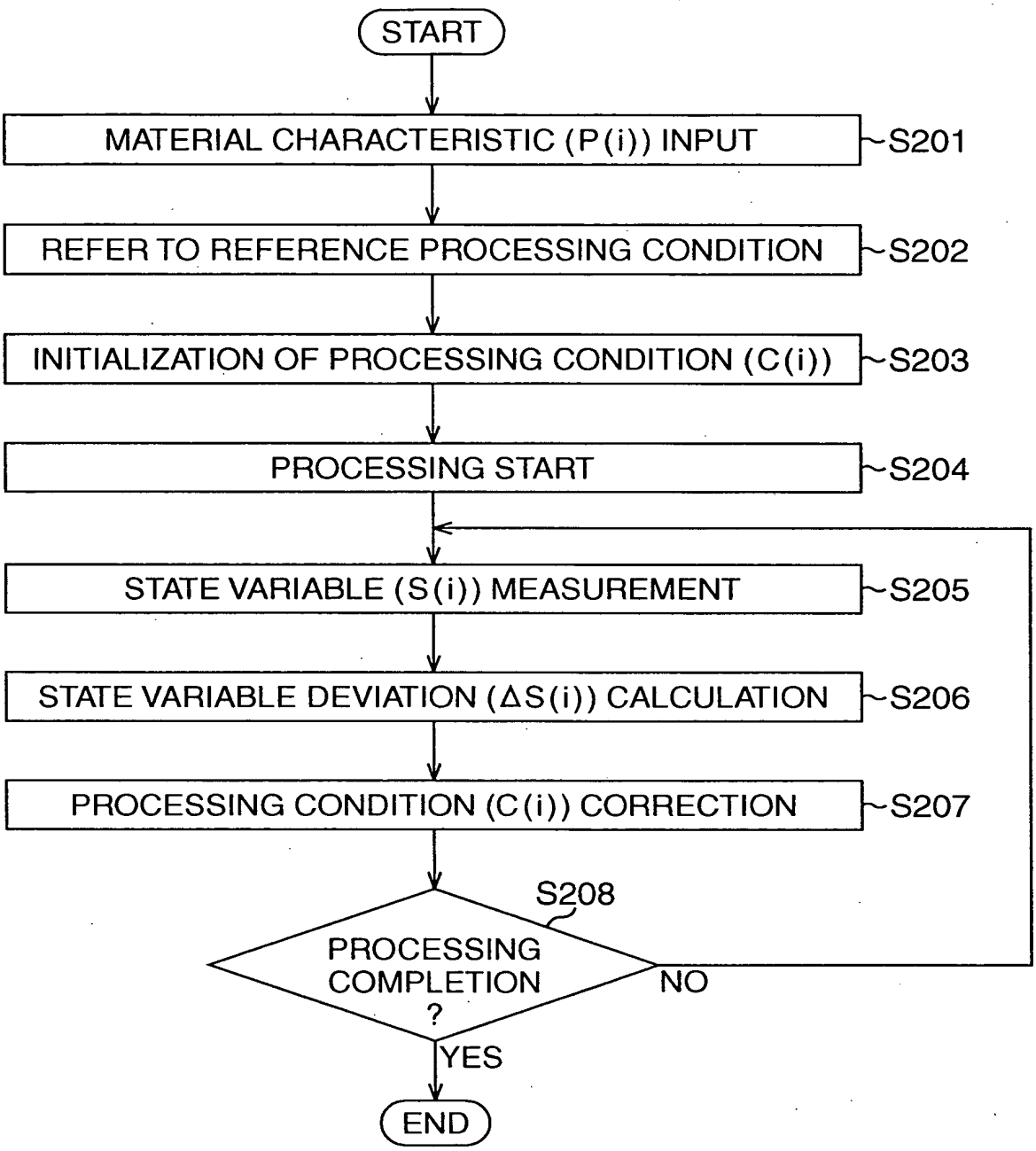

START
MATERIAL CHARACTERISTIC (P(i)) INPUT
S201
REFER TO REFERENCE PROCESSING CONDITION
S202
INITIALIZATION OF PROCESSING CONDITION (C(i))
S203
PROCESSING START
S204
STATE VARIABLE (S(i)) MEASUREMENT
S205
STATE VARIABLE DEVIATION (ΔS(i)) CALCULATION
S206
PROCESSING CONDITION (C(i)) CORRECTION
S207
S208
PROCESSING COMPLETION ?
NO
YES
END

FIG. 3

		MATERIAL CHARACTERISTIC VALUE (P)												
		SHEET THICKNESS	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	n VALUE	r VALUE	PLASTICITY COEFFICIENT	HARDNESS	TEMPERATURE	ROUGHNESS	FRICTION COEFFICIENT	LUBRICANT FILM THICKNESS	.....
FORMING CONDITION INITIALIZATION VALUE (C0)	FORMING SPEED	0.2	0.2	0.3	0.4	0.5	0.2	0.3	0.2	−0.1	−0.2	−0.5	0.5	*.*
	BLANK-HOLDING FORCE	0.4	0.4	0.6	0.8	1.0	0.4	0.6	0.4	−0.2	−0.4	−1.0	1.0	*.*
	METAL MOLD TEMPERATURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*.*
	.....	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*

FIG. 4

		STATE VARIABLE (S)									
		PUNCH REACTION	METAL MOLD TEMPERATURE	METAL MOLD DISTORTION No.1	METAL MOLD DISTORTION No.2	METAL MOLD DISTORTION No.3	DISPLACEMENT No.1	DISPLACEMENT No.2	DISPLACEMENT No.3	MATERIAL TEMPERATURE	.....
FORMING CONDITION CORRECTION AMOUNT (C)	FORMING SPEED	−1.0	−0.5	−0.2	−0.2	−0.2	−0.2	−0.2	−0.2	−0.5	*.*
	BLANK-HOLDING FORCE	−1.0	−0.5	−0.2	−0.2	−0.2	−0.2	−0.2	−0.2	−0.5	*.*
	METAL MOLD TEMPERATURE	0.0	−1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	*.*
	.....	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*	*.*

FIG. 5

	P(1) (SHEET THICKNESS /mm)	P(2) (YIELD STRENGTH /MPa)	P(3) (TENSILE STRENGTH /MPa)	P(4) (TOTAL ELONGATION /%)	P(5) (HARDNESS /Hv)
COIL TYPICAL MECHANICAL PROPERTIES	1.175～ 1.225	145	285	43	145
REFERENCE VALUE	1.200	140	280	42	140

FIG. 6

STANDARD PROCESSING CONDITION	VALUE
C0 (1) (FORMING SPEED)	50mm/sec.
C0 (2) (BLANK−HOLDING FORCE)	50kN

FIG. 7

	P(1) (SHEET THICKNESS)	P(2) (YIELD STRENGTH)	P(3) (TENSILE STRENGTH)	P(4) (TOTAL ELONGATION)	P(5) (HARDNESS)
C0 (1) (FORMING SPEED)	0.2	0.2	0.3	0.4	0.2
C0 (2) (BLANK− HOLDING FORCE)	0.4	0.4	0.6	0.8	0.4

FIG. 8

	S(1) PUNCH REACTION 10mm	S(2) PUNCH REACTION 20mm	S(3) PUNCH REACTION 30mm	S(4) METAL MOLD TEMPERATURE (AT FORMING START)
REFERENCE VALUE	20kN	40kN	65kN	30°C

FIG. 9

	S(1) PUNCH REACTION 10mm	S(2) PUNCH REACTION 20mm	S(3) PUNCH REACTION 30mm	S(4) METAL MOLD TEMPERATURE (AT FORMING START)
C(1) (FORMING SPEED)	−1.0	−1.0	−1.0	−0.5
C(2) (BLANK−HOLDING FORCE)	−1.0	−1.0	−1.0	−0.5

FIG. 10

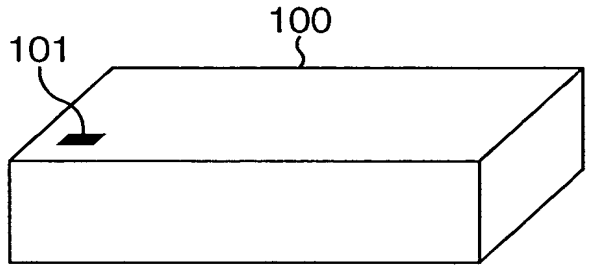


FIG. 11

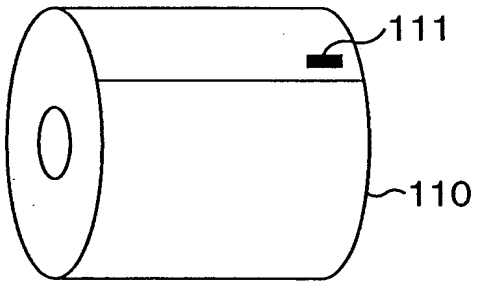


FIG. 12

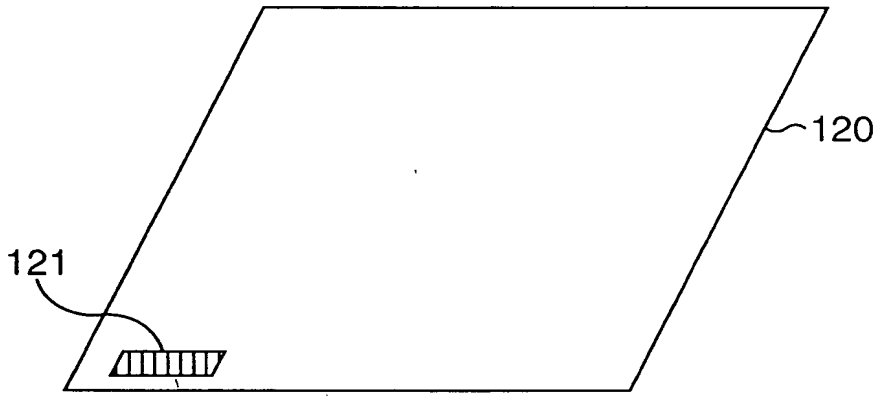
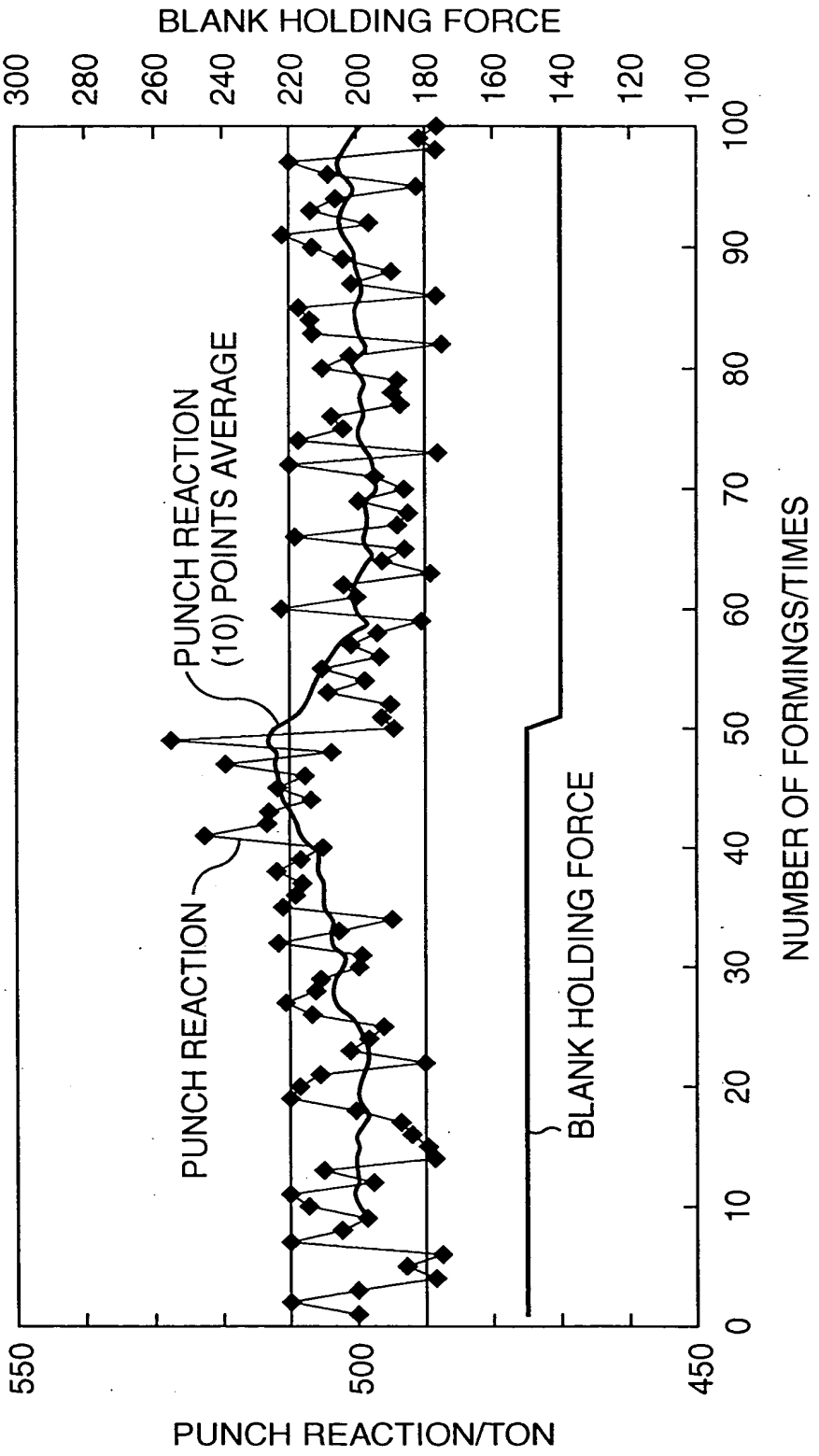


FIG. 13


BLANK HOLDING FORCE
300
280
260
240
220
200
180
160
140
120
100
PUNCH REACTION
(10) POINTS AVERAGE
PUNCH REACTION
BLANK HOLDING FORCE
550
500
450
PUNCH REACTION/TON
0
10
20
30
40
50
60
70
80
90
100
NUMBER OF FORMINGS/TIMES